

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
17 May 2001 (17.05.2001)

PCT

(10) International Publication Number
WO 01/34454 A1

(51) International Patent Classification⁷: B62D 53/08

(21) International Application Number: PCT/SE00/02172

(22) International Filing Date:
7 November 2000 (07.11.2000)

(25) Filing Language: Swedish

(26) Publication Language: English

(30) Priority Data:
9904091-7 12 November 1999 (12.11.1999) SE

(71) Applicant (for all designated States except US): SCANIA
CV AKTIEBOLAG (publ) [SE/SE]; S-151 87 Södertälje
(SE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): ANDERSSON, Uno
[SE/SE]; Lundby, S-646 92 Gnesta (SE).

(74) Agent: FORSELL, Hans; Scania CV AB, Patents, S-151
87 Södertälje (SE).

(81) Designated States (national): BR, JP, US.

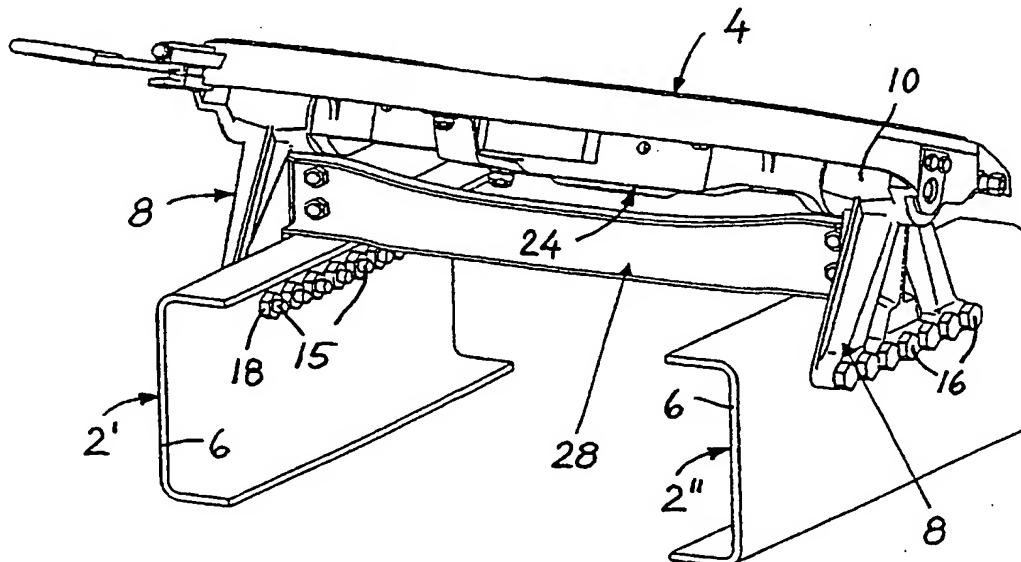
(84) Designated States (regional): European patent (AT, BE,
CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,
NL, PT, SE, TR).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CONNECTION ARRANGEMENT COMPRISING A FIFTH WHEEL



WO 01/34454 A1

(57) Abstract: Coupling arrangement intended for mounting on a towing vehicle provided with parallel frame side members (2', 2'') and for coupling said towing vehicle detachably to a towed vehicle such as a trailer. The arrangement incorporates a fifth wheel (4) which is tiltably connected to the frame side members (2', 2'') by tilt pivot mountings in the regions of the frame side members. Each tilt pivot mounting incorporates a vertically upright support device (8) made integrally and intended to be fastened directly by means of a lower fastening portion (12) to the outside of a vertical web portion (6) of the respective adjacent frame side member (2' or 2''). The support device (8) has in its upper end a bearing sleeve (10) in which a hingepin mounted on the underside of the fifth wheel (4) is supported. Each support device (8) incorporates at least two supporting legs (20, 22) which extend between the fastening portion (12) and the bearing sleeve (10).

Connection arrangement comprising a fifth wheel

The invention relates to a coupling arrangement of the kind indicated in the preamble to patent claim 1.

5

State of the art

US A 5,368,324 refers to and describes several different types of fastening systems for fifth wheels. Such a fifth wheel is mounted for tilting on the beam frame of a towing vehicle and constitutes a coupling element with a fastening intended for detachable connection to the corresponding coupling spigot of a trailer vehicle.

The fifth wheel is a horizontally arranged partly circular plate with a radial insertion aperture for the trailer's coupling spigot. This insertion aperture extends radially

10 inwards from an extended edge portion of the plate to the centre of the plate. The fifth wheel is mounted for tilting on the beam frame of the towing vehicle by means of a pair of tilt pivot mountings situated at diametrically opposite side edges of the plate. Each tilt pivot mounting incorporates a forked parallel-flange bearing bracket on the underside of the plate and a pivot bearing which is mounted on top of a horizontal
15 upper flange of the respective frame side member and which incorporates L-section elements which constitute foot portions which are supported on the upper flange of the frame side member.

The parallel-flange bearing brackets are supported for tilting on the pivot bearings by

20 means of pivot pins running through them. Various kinds of strengthening plates and reinforcement elements (e.g. L-section elements or angle support elements) are used in different embodiments to strengthen and stiffen the fastenings of the foot portions of the pivot bearings.

30 The aforesaid known fifth wheel fastening systems thus involve pivot bearings for the fifth wheel's pivot mountings being situated on top of the horizontal upper flanges of the frame side members, and various kinds of strengthening and stiffening section

elements and angle bracket supports being fastened to the upper flanges and web portions of the frame side members.

The tilt pivot mountings of the fifth wheel are thus composed, according to the
5 aforesaid patent specification, of a number of separate parts and the factors on which their dimensioning directly depends include the width of the upper flanges of the frame side members.

Objects of the invention

10

The primary object of the invention is to provide a coupling arrangement whereby the two tilt pivot mountings of the fifth wheel consist of constructionally simple integrated units which can be fitted directly to the frame side members without having to add any supplementary parts or reinforcement elements.

15

A further object is to adopt tilt pivot mountings so designed that the total weight of the coupling arrangement can be kept down without impairing the strength or rigidity of the structure.

20 Another object of the invention is to make the tilt pivot mountings independent of the results of the tolerance on the width dimensions of the towing vehicle's frame.

Description of the invention

25 The above objects are achieved according to the invention by the coupling arrangement indicated in the introduction exhibiting the features indicated in the characterising part of patent claim 1.

A primary distinguishing feature of the invention is therefore that the two tilt pivot
30 mountings of the coupling arrangement each incorporate a vertically upright integrally made support device intended to be fastened directly, by means of a lower fastening portion, to the outside of a vertical web portion of the adjacent frame side member.

This support device has in its upper end a bearing sleeve in which a hingepin mounted on the underside of the fifth wheel is supported.

The support device incorporates with advantage at least two column-shaped supporting legs which converge upwards from the fastening portion to the bearing sleeve. The force flow in the support device resulting from its being structurally constituted in this way is favourable from the strength point of view when the support device is subjected to large load forces by the trailer vehicle's coupling spigot via the fifth wheel. This preferred embodiment of the support device also means that the latter can have its weight reduced by being provided with one or more lightening holes in the region between the pillar-shaped supporting legs.

In addition to the converging supporting legs, the support device may also have a vertical supporting leg situated between them, as indicated in patent claim 4.

15 The fastening portion of the support device takes the form with advantage of a horizontally extended "triangular base element" provided with a number of fastening apertures situated at equal intervals for fastening the support device to the outside of the frame side member's web portion by means of fastening bolts running through.

20 In some cases it may be desirable that the fifth wheel be situated somewhat higher than the upper flanges of the frame side members. In such cases it may be justified to connect the two support devices of the coupling arrangement by means of a special transverse connection preferably situated in accordance with patent claim 5. The
25 transverse connection, which may for example be a rolled section beam element, may itself exhibit, for example, a I-shaped or C-shaped cross-section. The two ends of the transverse connection may then with advantage be fastened in a vertical supporting leg of the support device.

30 As indicated above, each of the coupling arrangement's support devices has to be made in the form of an undivided integral constructional unit. This may be achieved, for example, by the support device being manufactured as a cast or forged constructional element or being formed from sheetmetal. Alternatively, the support

device may consist of components welded together, such as a bearing sleeve welded to a pair of oblique supporting legs joined together at the bottom by a horizontal fastening portion welded to them.

- 5 A coupling arrangement with support devices according to the invention will be easy to place in an optimum fitting position in the longitudinal direction along the outside of the frame side members. This makes it easy to move the coupling arrangement's fastening point from a first position along the frame side members to a different frame side position forward or rearward from that first mentioned. Shifting or moving the
10 coupling arrangement along the frame side members in order to place the fifth wheel in the desired position in the longitudinal direction of the towing vehicle will be particularly easy if the two support devices of the coupling arrangement are joined together by a transverse connection.

15 Brief description of the drawings

The invention will now be illustrated and explained further with reference to embodiments depicted in the attached drawings, which are as follows:

- 20 Fig. 1 depicts in perspective an embodiment of a coupling arrangement according to the invention, with the fifth wheel tilted rearwards;
Fig. 2 depicts in perspective the coupling arrangement according to Fig. 1, with the fifth wheel in a horizontal position;
Fig. 3 depicts in vertical projection one of the support devices for the coupling
25 arrangement according to Figs. 1-2;
Fig. 4 depicts in perspective the coupling arrangement according to Figs. 1-2 with the fifth wheel removed, and
Fig. 5 depicts an alternative embodiment of the support devices according to Fig. 3.

30 Description of embodiments

Figs. 1-2 depict an embodiment of a coupling arrangement according to the present invention. The coupling arrangement is mounted on a pair of frame side members

2' .2" which run parallel and form part of the beam frame for an otherwise undepicted towing vehicle. The coupling arrangement incorporates three main parts, namely a fifth wheel 4, which is mounted for tilting in the region above the frame side members, and two support devices 8 which are bolted to the outside of the webs 6 of the frame side members and constitute supporting tilt pivot mountings for the fifth wheel 4. The two support devices 8 are of the type shown in more detail in Fig. 3 and consist of an integrally made pivot bearing which is provided at the top with a bearing sleeve 10 and at the bottom with a horizontal fastening portion 12.

- 10 The fastening portion 12 has a row of boltholes 14 (numbering seven in this case) running through it to accommodate fastening bolts inserted in holes running through the beam web 6. The fastening bolts 15, which have heads 16, are provided with nuts 18 situated on the inside of the beam web 6. In this embodiment, the number of holes through the beam web 6 corresponds to the number of boltholes 14 in the fastening portion. In an alternative embodiment it is possible to provide more holes in the beam web than in the fastening portion in order to make it possible to shift the fifth wheel along the frame side members and fasten the fifth wheel in a desired position relative to the frame side members. In the present example, threaded connections are used for fastening the respective support devices to the beam web but it is of course also
- 15 possible to use riveted connections without going outside the concept of the invention.
- 20

From the opposite ends of the fastening portion 12, a pair of column-shaped supporting legs 20,22 converge obliquely upwards to the lower part of the bearing sleeve 10. Each support device 8 is thus fastened directly, by its fastening portion 12,

- 25 to the outside of the adjacent frame side member web 6. Hingepins (not visible in Figs. 1-2) fitted in the ends of a strengthening and supporting portion 24 which extends diametrically on the underside of the fifth wheel 4 are fitted in the bearing sleeves 10 of the support devices 8.

- 30 In this case the support device 8 is provided, in the space between its two oblique supporting legs 20,22, with a further supporting leg 26 which extends vertically upwards from the fastening portion 12 to the underside of the bearing sleeve 10. In the version depicted in Figs. 1-2 and Fig. 4 the two support devices 8 of the coupling

arrangement are linked together by a transverse connection 28 in the form of an I-bar or C-bar situated transversely above the frame side members 2',2", centrally beneath the bearing sleeves 10 and the strengthening and supporting portion 24. The respective ends of the transverse connection 28 are fastened in the vertical supporting legs 26 of the respective supporting devices 8, so the vertical supporting legs 26 are with advantage provided, at least in these fastening regions, with planar web portions of equal thickness.

The pivot-bearing-like support devices 8 are each made in the form of an undivided constructional unit which may be manufactured as a cast or forged constructional element. It is also conceivable that the support devices be made of formed sheetmetal or be made up of components welded together.

To facilitate fitting the support devices 8 to the respective beam webs 6, each of the support devices 8 is provided, as indicated in Fig. 5, with a protruding portion 35 intended to abut supportingly against a frame side member. During the assembly process, the protruding portion 35 is rested on the top of the frame side member, followed by fitting the fastening bolts 15. The protruding portion 35 may constitute an integral part of the support device 8 or be part of a separate unit which is fitted to the support device 8 by means of any form of fastening device, e.g. threaded connection.

Fig. 4 shows the same type of coupling arrangement as in Figs. 1-2 but with the fifth wheel 4 removed. In this case the frame side members 2',2" have a stiffening cross-member 30 fastened between them which is part of the beam frame and which has angle brackets 32 which are fastened to the inside of the respective beam web 6 by means of, inter alia, the bolts 15 used for fastening the support device 8 to the outside of the beam web 6.

Patent claims

1. Towing arrangement intended for mounting on a towing vehicle provided with parallel frame side members (2',2") and for coupling said towing vehicle detachably to a towed vehicle such as a trailer, which arrangement incorporates a fifth wheel (4) connected tiltably to the frame side members (2',2") by tilt pivot mountings in the regions of the frame side members, **characterised** in that each tilt pivot mounting incorporates a vertically upright integrally made support device (8) designed to be fastened directly by means of a lower fastening portion (12) to the outside of a vertical web portion (6) of the respective adjacent frame side member (2' or 2"), and the support device (8) has in its upper end a bearing sleeve (10) in which a hingepin mounted on the underside of the fifth wheel (4) is supported.

2. Coupling arrangement according to claim 1, **characterised** in that the support device (8) incorporates at least two column-shaped supporting legs (20,22) which converge upwards from the fastening portion (12) to the bearing sleeve (10).

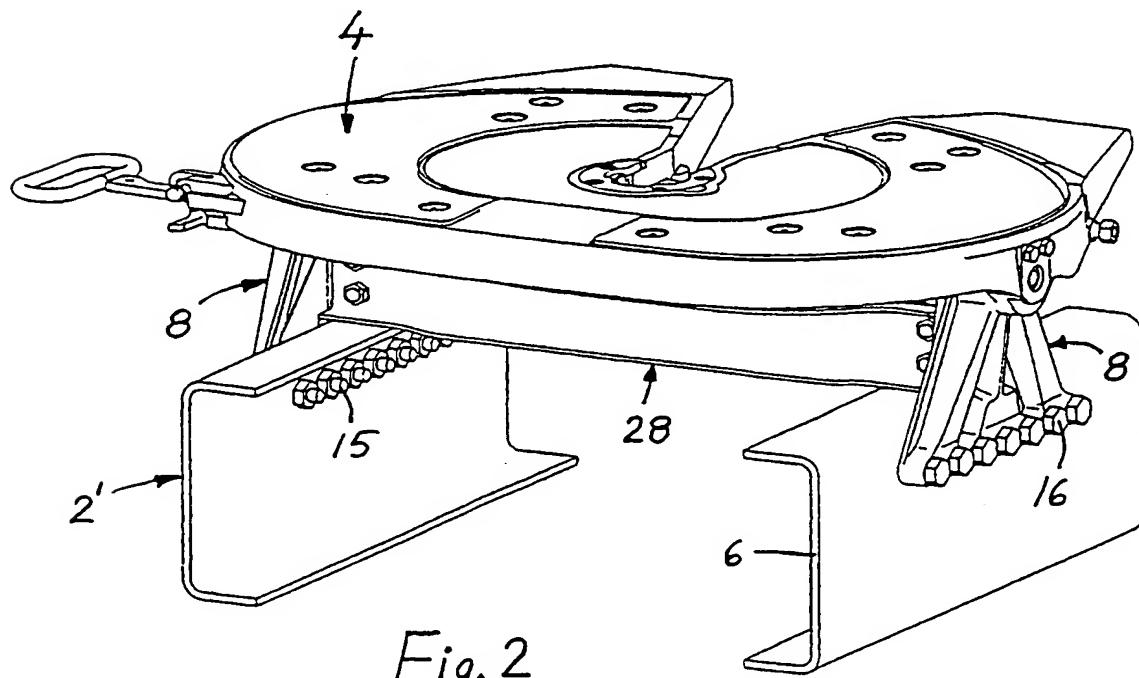
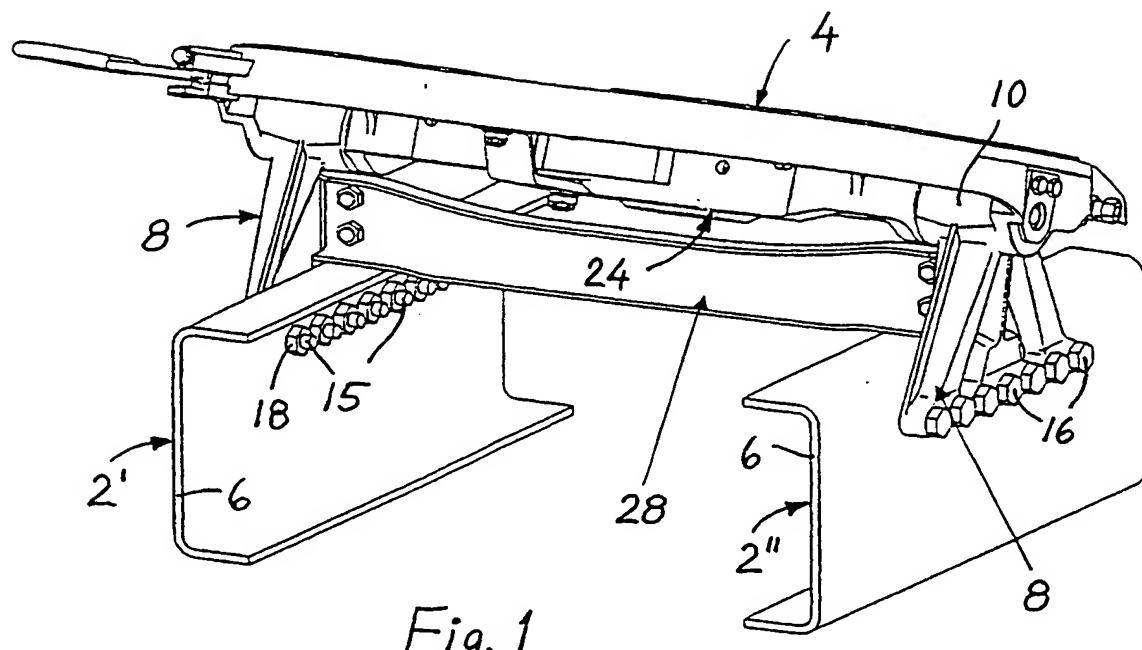
3. Coupling arrangement according to claim 2, **characterised** in that the supporting legs (20,22) start from opposite ends of the fastening portion (12).

4. Coupling arrangement according to claim 2 or 3, **characterised** in that the support device (8) incorporates not only the converging supporting legs (20,22) but also a substantially vertical supporting leg (26) situated between them which extends upwards from the fastening portion (12) to the underside of the bearing sleeve (10).

5. Coupling arrangement according to any one of claims 1-4, **characterised** in that the support devices (8) fastened to the outsides of the web portions (6) of the frame side members are connected to one another by a transverse connection (28), e.g. a rolled section beam element, situated in the same vertical plane as the bearing sleeves (10).

6. Coupling arrangement according to claim 4 or 5, **characterised** in that the respective ends of the transverse connection (28) are fastened in the vertical supporting legs (26) of the support device.
- 5 7. Coupling arrangement according to any one of the foregoing claims, **characterised** in that each support device (8) is made in the form of an undivided part which is manufactured as a cast or forged constructional unit or is formed of sheetmetal or made up of components welded together.

1/3



2/3

Fig. 3

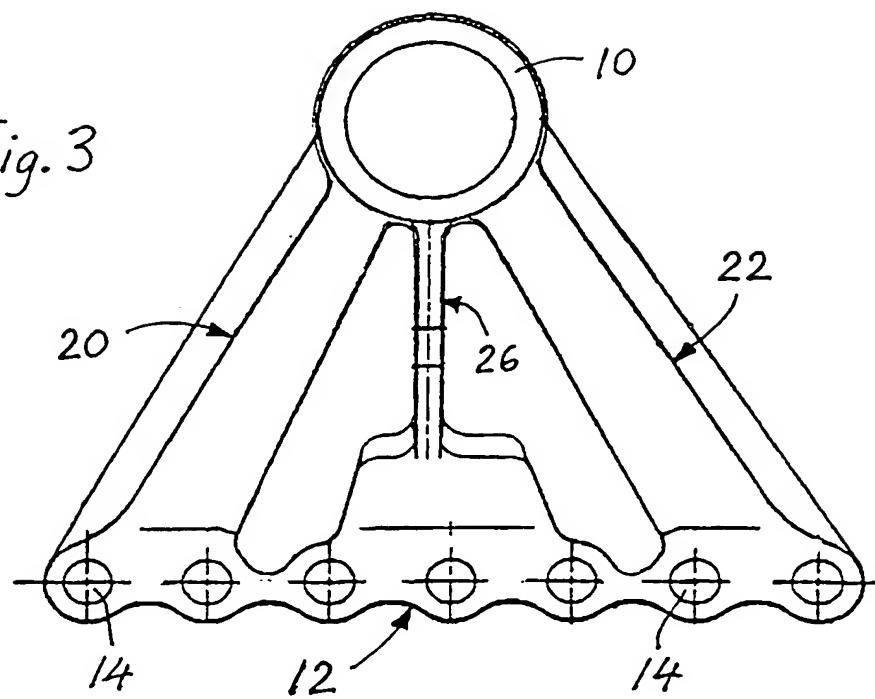
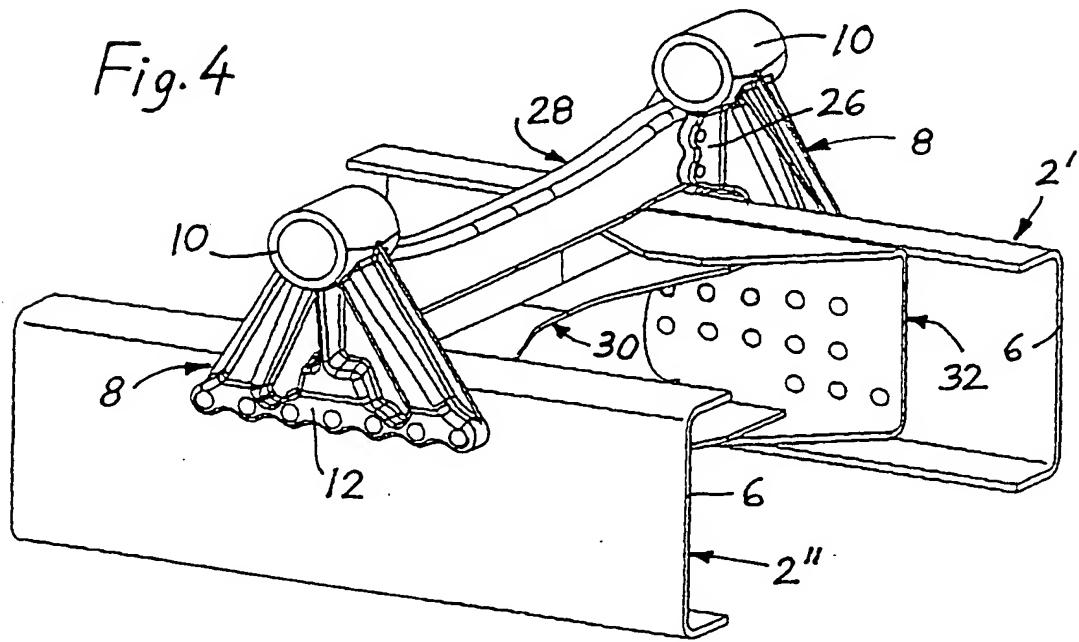


Fig. 4



3/3

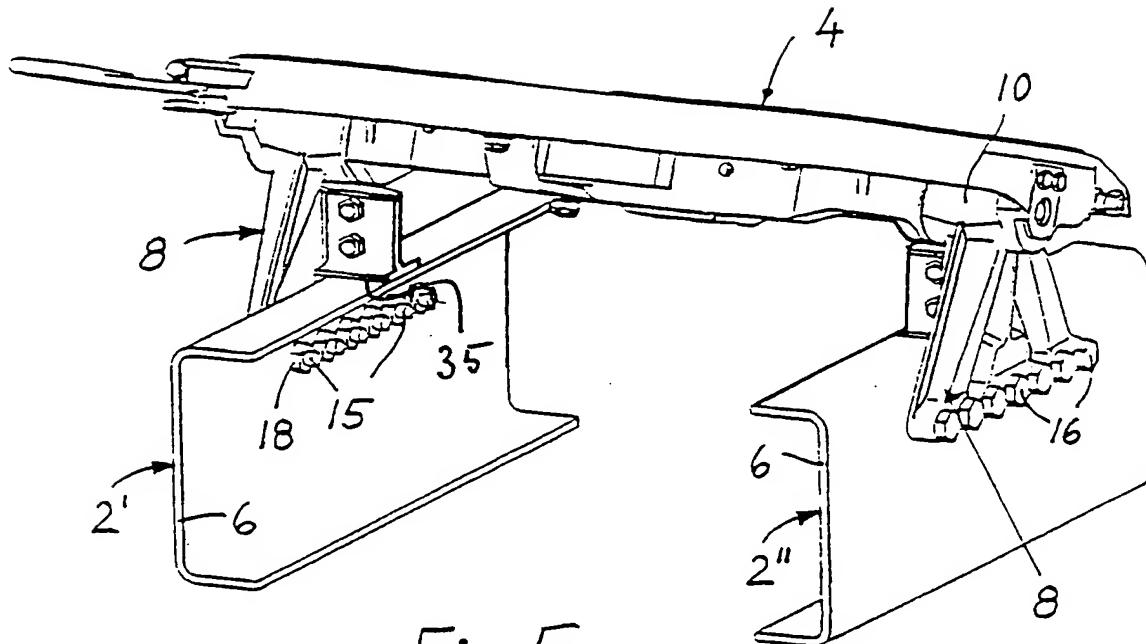


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/02172

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B62D 53/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B62D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0694467 A2 (ROCKINGER, SPEZIALFABRIK FÜR ANHÄNGERKUPPLUNGEN GMBH & CO.), 31 January 1996 (31.01.96), column 6, line 1 - line 19, figure 6	1
A	--	2-7
Y	EP 0768232 A1 (KAKUWA SEIKI KABUSHIKI KAISHA KAWAGOE-SHI), 16 April 1997 (16.04.97), figure 3	1
A	-- -----	2-7

Further documents are listed in the continuation of Box C. See patent family annex.

- * Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

15 February 2001

Date of mailing of the international search report

27 -02- 2001

Name and mailing address of the ISA

Swedish Patent Office
 Box 5055, S-102 42 STOCKHOLM
 Facsimile No. +46 8 666 02 86

Authorized officer

Göran Carlström/mj
 Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

27/12/00

International application No.

PCT/SE 00/02172

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP 0694467 A2	31/01/96	DE	4426840 A	01/02/96
		DE	59503908 D	00/00/00
EP 0768232 A1	16/04/97	SE	0768232 T3	
		AU	689390 B	26/03/98
		AU	6206296 A	17/04/97
		CA	2183844 A	10/04/97
		DE	69605004 D,T	24/02/00
		JP	9104370 A	22/04/97
		KR	231868 B	01/12/99
		US	5882028 A	16/03/99